

INSTITUTION OF CIVIL ENGINEERS. SESSION 1843.

No. 559.—ACCOUNT OF THE VICTORIA BRIDGE, ERRECTED ACROSS THE RIVER WEAR, ON THE LINK OF THE DURHAM JUNCTION RAILWAY. By DAVID BRENNER, Assoc. Inst. C.E.—The district through which the Durham Junction Railway passes, for the purpose of completing the connection between the city of Durham and the towns of Newcastle, South Shields, and Sunderland, is extensively undermined by coal-workings, and great caution was requisite in the selection of a spot which suited the level of the railway, and where a foundation could be formed sufficiently sound to support such a structure as the bridge described in the paper. The advice of Messrs. Walker and Burgess was therefore sought by Mr. Harrison, the engineer of the line, and their design was adopted; but subsequently several alterations were made, either to favour the locality or from motives of economy. The bridge is 210 feet 9 inches long, and 21 feet wide between the parapets. It is, with the exception of the quoins of the main arches, built of freestone from the Pensher quarries; there are three semicircular arches, of 144 feet, 100 feet, and 60 feet span respectively, a centre arch of 160 span, with a radius of 7½ feet, and three arches of 20 feet span each at either end, forming the abutments. The main pier is founded upon a rock, 24 feet beneath the bed of the river; and the height from the foundation to the top of the parapet is 156 feet 6 inches; the under side of the main arch, at the crown, is thus 121 feet 9 inches above the level of the sea. The paper describes at length the nature of the building materials employed, the dressing of the stones, the composition of the mortar, the general detail and dimensions of the construction, the centering of the arches, with the precautions used in striking them, and gives a very full account of the travelling and other cranes employed in the construction; these are stated to have been very efficient. The north arch, of 100 feet span, containing about 980 tons of stone, was entirely turned with two of the cranes, in twenty-eight hours, giving an average weight of 17½ tons of stone laid by each crane per hour. The perseverance and practical skill of Messrs. Gibb, of Aberdeen, the contractors, are particularly mentioned, as the difficulties attending the getting down the foundations, especially that of the main pier, were very great, and required all their talent and energy. The detail is given of the precautions taken with the coffer-dam, in which, at one period, a steam-engine of twenty-horse power, working two pumps of 18 inches diameter each, was insufficient to keep down the water, and it became necessary to drive a range of sheet piling all round within the dam, before the leakage through the had strata above the rock could be stopped. By calculation it appears, that the pressure on the foundation of the highest pier of the bridge is about 37 tons on each square foot, exclusive of the additional weight of the passing rail train, which frequently weigh 120 tons each. The bridge was commenced on the 17th of March, 1836, and was finished on the 28th of June, 1839, occupying about 714 working days, and cost, with extra works, nearly 40,000*l*. The paper is illustrated by three drawings, shewing a plan and elevation of the bridge in several stages of its construction, and when completed; the details of the centres, hoists, and cranes, the coffer-dam, engine, pumps, and of the foundations of the whole structure. Mr. Vignoles had examined the bridge very minutely, and had been much struck with the excellence of the workmanship, which was quite in accordance with the beauty and simplicity of the original design; it was an extraordinary example of care and attention on the part of the contractors, and did infinite credit to all engaged in it; yet with all this, it had cost less, in proportion to its dimensions, than any similar structure in this country. The President observed, that the structure first proposed was to have been of cast iron, but when he and his partner (Mr. Burgess) were consulted, they advised the employment of the freestone from the adjoining quarries on Lord Londonderry's estate, and they furnished a design, based upon that of Trajan's bridge, at Alcantara, which was adopted by the directors; but subsequently an alteration was made, by introducing three small arches in each

abutment, which, in his opinion, had injured the design; that was the extent of his connection with the bridge; the merit of the construction must be given to the engineer and the contractors, and he must corroborate the statement of the superior manner in which the work had been executed. The bridge had been placed nearly at the spot marked out by Mr. Telford, for the great north road to cross the Wear, and as the railway would now form part of the line between Newcastle and Darlington, Mr. Telford's plan would be virtually executed, although with the difference of substituting a railway for a turnpike road.

INSTITUTE OF BRITISH ARCHITECTS, JULY 24.

W. TITE, Esq., V.P. in the chair.—A paper was read by Professor Donaldson, V.P., explanatory of the peculiar arrangement of the fronts of some houses in Belgian towns erected in the 15th, 16th, and 17th centuries, illustrated by a numerous collection of sketches of decorated fronts of ancient dwelling-houses, &c., formed of stone, brick, and wood, in Tournay, Mechlin, Antwerp, and Bruges, taken by him during a tour last Autumn.

Mr. Maughan explained the process adopted by Mr. G. Payne, the patelee, for the preservation and improvement of wood and other vegetable matters.

This being the last meeting of the session, the chairman addressed the members, and alluded generally to the results of the session as having been satisfactory; that many papers of great interest had been read at the meetings, and various committees had been engaged during the session in the consideration of topics of an important nature, connected both with the practice of architecture in general, and the interests of the Institute. He alluded, likewise, to the proposed New Building Act; now before Parliament, as having met with very general opposition, but was now referred for revision to three gentlemen, two of whom were members of the Institute, and there was reason, therefore, to expect that it would be greatly modified and improved; that the subject had much occupied the attention of the council, who were desirous of doing every thing in their power towards the accomplishment of that desirable object. He further noticed the increased attention given to the subject of Gothic architecture, of which he avowed himself a warm admirer, but at the same time considered it proper to caution the junior members from being led astray by the very strong and unqualified language of some writers of the present day on the subject, which tended to recommend the exclusive practice of that style on all occasions and for all purposes, to the total neglect of the classical styles of Greece and Italy, which must nevertheless be acknowledged as infinitely more suitable on many occasions for modern purposes.

YOUNG ENGLAND.

TO THE EDITOR.

SIR.—In a late number of your very interesting journal, in treating of the application of Life Assurance to securing to tenants the absolute freehold of the house or farm, in which by the present system of occupation they can have no living interest, you observe that the dearest interests of "Old England" are involved in the projected scheme of freehold assurance, inasmuch as it promised to give to every man a new and lasting tie to his country.

But it appears to me that "Young England" has even more to hope from the system than the mother country, and promises more advantages to the capitalist who will enter upon it. By "Young England," I may observe that I do not here intend any allusion to the "Young England" of Mr. Joseph Home and the *Spectator*, that Heraclitus of the press, viz., the white-waistcoated and white-neckcloth'd gentry, whose pleasure and business it is to make speeches of a certain class in the House of Commons, but the young colonies of Englishmen, now forming in all parts of our colonial empire. You propose to give to the house tenant the freehold of his house on condition of his paying you an annuity on his life instead of a rent. Doubtless, with proper precautions against the effects of depreciation of property in England, by deferring the period of purchase, for example, until some years' payments had been made, and charging a bonus premium for the bare insurance, a large proportion

of the locked-up capital of this country might thus find ample investment. But colonial land, under proper and active colonization, *must* increase in value; it is at its minimum on the formation of the settlement, and therefore here there would be inexhaustible scope for the application of this freehold assurance project. It is to be observed with the *Examiner* newspaper, one of the most sensible and impartial of the opponents of systematic colonization, that there is one radical evil in the Wakefield system, as at present in operation, that it involves in the very outset the sinking of capital in land and labour.

The colonist is, in general, not a capitalist (never a large capitalist), but what we may call an *incomist*, his income often being not in his pocket, but in his character and in his head and his hands. He has not 20*l*. of capital, even though he may have 20*l*.; for capital, in the wide sense, is the accumulation of years of industry; and the 20*l*. saved out of a few years' toil represents only the aggregate income of these years, but does not in the available sense claim the name of capital. The colonist, therefore, can pay an annual sum, but he is not justified in launching out the boardings of a few years in land. But, again, the general feeling in the new colonies is decidedly against sinking income in the shape of rent, so common in this country, and productive of such disastrous consequences and cruel injustice in Ireland. What then remains? Either, on a small scale, to secure the freehold of small properties by combination of annual contributions, as in the English building societies; or, on a large and truly effective scale, by payment of life annuity instead of rent; one annual payment so calculated, guaranteeing the freehold to the heirs of the annuity payer, as well as securing the lender the return of his capital.

A Scottish Kirk colony has been lately established in New Zealand on a very excellent theory of preparation; and as far as the funds will provide for such preparation, the result will be a flourishing and a comfortable settlement. The charge of 2*l*. an acre is made for the land; and out of this 2*l*. thirty-shillings is devoted to emigration, the building of roads and bridges, &c. We would go a step further, and without waiting for gradual sales of land, make every preparation at once: and the necessary means—the money—we should gather in this way.

We shall suppose that the Church of England establishes the next New Zealand settlement. Let the friends of the church and the English capitalist purchase of the Government or the New Zealand Company at once, by combined capital, one hundred thousand acres of land, at (on an average of town, rural, and suburban land) four pounds an acre.

Out of this allot to the	
New Zealand Company	£100,000
Emigration	100,000
Religion and Education	100,000
Roads, Bridges, Clearing, &c.	100,000
	£400,000

And charge the public at the rate of 5*l*. an acre, to be paid, not at once, but by annuity, secured on land necessarily increasing year by year in value from such effective combination. A yeoman (whose physical health must of course be certified) of 40 years of age might, on this principle, be secured in the immediate freehold of a farm of 100 acres by a payment of 37*l*. 10*s*. per annum, to revert to his children or heirs at his death, *unincumbered*. The New Zealand Company, and the English capitalist, and the English people, would rapidly feel the good effects of such a system. For the security would be unexceptionable, the advantage to the yeoman antecedent in any colonial scheme, while the good result to the church or sect forming the settlement, as well as to the settlers, would be realized in a very few years. Let the church do this—and let the Wesleyans, and the Catholics, and other religious denominations, follow their example, and colonial and social progress will receive a new stimulus, and sectarian jealousies will be abolished with their causes. You will perhaps permit me to enter more fully into detail on a future occasion.

Meanwhile I am, respectfully, yours,
MIDDLEAGED ENGLAND.

FURTHER EXTENSION AND ACCELERATION OF THE MORNING MAILS.—By command of the Postmaster-General, Salisbury and Stockbridge are added to the list of 180 post towns despatched every morning from the General Post-office in St. Martin's-le-Grand. We understand also, that on and after Tuesday, the 1st of August, the down mail to Birmingham will leave the chief office at half-past nine, A.M., instead of ten, as heretofore. This acceleration will not, it is expected, cause any alteration in the time of posting letters and newspapers either at the General Post-office or at the several branch offices throughout the metropolis.